CONTENTS.

VOL. X.

Page

Acoustic telegraphy, application of 266
Admiralty experiments on Screw propulsion 502
Alloy, metallic 479
American Society of Civil Engineers 88, 185, 376, 473
Applied electricity 50
Aqua da Verrugas 188
Arches, theory of ...97, 193, 289, 385
Architectural Association 279
Architecture, brick 247
Architecture in the eleventh century 338
Architecture of China 135
Art, effect of engineering upon 563
Artificial fuel compared with coal 320
Artillery experiments 208
Artillery, new field guns for .. 476
Asphalt pavements 530
Atmosphere as a vehicle of sound 548
Attraction of magnets 521

Bessemer process, chemistry of 280
Blast furnace slag, utilization of 109
Boiler explosions 155
Boiler flues, formation of deposits in 95, 192
Boiler shells, strength of 40
Boiler tubes, probable cause of the destruction of 71
Boiler wall, blue flag for 480
Boilers, choice of 267
Boilers, horse-power of 406
Boilers, incrustation in 384
Bollman truss 253

Book Notices:
Adams, W. M. Outlines of geometry, or, motion of a point 380
Allan W. Theory of arches 569
Armstrong, H. E. Introduction to the study of inorganic chemistry. The chemistry of carbon and its compounds 381
Art student. Free hand drawing 94
Bamber, E. F. Mechanical text-books, or, introduction to the study of mechanics and engineering. 95
Bonniceau, M. Études sur les constructions á la mer 381
Bow, R. H. Economics of construction in relation to framed structures 478

Page

Burn, R. S Building construction, vols. 1 and 2 .. 381
Carfield, W. H. Manual of public health 570
Carpenter, James. The moon considered as a planet, a world, and a satellite 478
Cavalli, H. Tableaux comparatifs des mesures poids et monaies 381
Chesney, C. C. Essays in military biography 569
Church, J. A. Notes on a Metallurgical journey in Europe 190
Clivenger, L. V. Treatise on the method of Government surveying 93
De Kormick, L. L., and E. Dietz. Practical manual of chemical analysis and assaying 379
Dragendorf. Manuel de toxologie 479
Ede, G. Management of steel 568
Elliott, J. Complete practical treatise on the nature and use of logarithms, and on plane trigonometry 567
Ferguson, J. History of architecture 569
Gas Consumer's Manual; or, setting and working retorts 95
Gawler, J. G. Silsham; with hints on mountain and jungle warfare 94
Harris, R. H. Allston's seamanship 570
Jordan, W. L. Ocean, its tides and currents 287
Kohlrausch, F. Physical measurements 189
MacCord, C. W. Practical treatise on the slide-valve by eccentrics 285
Mallet, A Compound engines 569
May, F. R. G. S. Treatise on nautical surveying .. 570
Michael, W. H. Manual of public health 570
Nasmith, James. The Moon considered as a planet, a world, and a satellite 478
Parkinson, S. Elementary treatise on mechanics ... 569
Perry, J. Elementary treatise on steam 381

Page

Pettigrew, J. B Animal locomotion; or walking, swimming, and flying, with a dissertation of aeronautics 191
Pierce, W. T. Treatise on practical solid or descriptive geometry 94
Pink, W. W. Analytical chemistry 286
Proctor, F. Pocket-book of useful tables and formulæ for marine engineers 568
Proctor, R. A. Universe and coming transits 569
Proctor, R. A. Borderland of science 94
Proctor, R. A. Light science for leisure hours . 93
Rankine, W. J. M. Mechanical text-book; or, introduction to the study of mechanics and engineering 95
Revy, J. J. Hydraulics of great rivers 380
Siebe, H. Conquest of the sea, a book about divers and diving 567
Siemens, W. Fuel. 381
Smyth, P. Our inheritance in the great pyramid 569
Stevenson, Thomas. Design and construction of harbors 478
Stewart, B. Conservation of energy 190
Stuart, B. How to become a successful engineer 94
Tait, P. G. Elementary treatise on quaternions .. 381
Tate's surcharged, and different forms of retaining walls 380
Thearle, J. S. P. Naval architecture, an elementary treatise on laying off wood and iron ships 379
Thorpe, T. E. Manual of inorganic chemistry 287
Timbs J. Year-book of facts in science and art 567
Toner, J. M. Dictionary of elevations and climatic register of the United States 381
Turnbull's treatise on the compound engine 380
Tyndall, J. La Chaleur; mode du mouvement 569

14794

	Page
Van Nostrand's Monthly Record of Scientific Literature	569
Wanklyn, J. A. Manual of public health	570
Wanklyn, J. A. Milk analysis	479
Weale's engineer, architect and contractor's pocket-book for 1874	570
Webster, G. E. Analytical chemistry	286
Weisbach, J. Manual of the mechanics of engineering and of the construction of machines, with an introduction to the calculus	568
Wilson, R. Treatise on steam boilers; their strength, construction and economical working	191
Wormald, J. Value of artificial fuel as compared with coal	381
Young, E. W. Simple practical methods of calculating strains on girders, arches and trusses.	190
Brass	416
Brick architecture	247
Bricks, compressed stone	245
Bridge building. Some open questions in	61
Bridge Company of Baltimore	91, 284
Bridge, Detroit	378
Bridge, International	91
Bridge, iron, at Boonville, Mo.	91
Bridge, Jay	476
Bridge, new hydraulic, at Leith	187
Bridge, West Illinois	288
Bridges in France	187
Bridges, proportions of pins used in	28
Building, fire-proof	533
Caligny's apparatus for raising water	163
Calorimeter in locomotive engine boilers	48
Canals, interoceanic	188
Cement, Portland	349
Change of shore level near Bordeaux	570
Channel passage	475
Channel tunnel	271
Chemical constitution of steel	210
Chemistry of Bessemer process	280
Chimney shafts, proportions of tall	95
China, architecture of	135
"City of Peking"	477
Civil and Mechanical Engineers' Society	563
Clamond's industrial generator of electricity	69
Coal, artificial fuel compared with	320
Coal mines, explosions in	272
Coal supply	401
Cold, mechanical production of	447
Colmation	331
Compass adjustment in iron ships	425
Compasses, effect of unequal heat on	524
Compound engine	145
Compound engines	296, 450
Compound engines, high pressure cylinders of	188
Compounds, explosive	31
Concrete construction	287
Condenser, novel	400
Construction of conical roofs	544
Construction on the Continent	283
Cooper, Peter	382
Copper, notes on	329
Corrosive effect of impure water upon surface condenser tubes	125
Cylinders, high pressure, application of steel liners to	138
Derailment	85
Design and construction of storage reservoirs	1
Development of force from explosive agents	506
Discussion of the applied forces in a drawbridge	551
Disintegration and utilization of slag	509
Dome, Vienna	417
Drainage by the action of waves	163
Drainage of small towns	104
Drawbridge without false works, erection of	368
Drying of sewage deposits	250
Dynamite experiments	266
Economy of fuel	65
Editorial note	288
Education in the United States	345
Effects of unequal heat on the compasses of iron vessels	524
Electric conductors	521
Electric light, novel and simple	192
Electric talegraphy, application of	166
Electricity applied	50
Electricity, Clamond's industrial generator of	69
Electricity, evaluation of quantity	288
Electricity, terrestrial	440
Electro magnets	264
Electro stannus	570
Elements of cost of railroad freight traffic	461
Engine boilers, locomotive, calorimeter in	48
Engine, compound	145
Engine of war	378
Engine, remarkable pumping	383
Engineering, its effect upon art	563
Engineers' Society, Civil and Mechanical	563
Engines, compound	296, 450
Engines, compound high pressure, cylinders of	138
Engines, single v. compound	480
Engineering, telegraphic	257
Engineers, American Society of Civil	88, 185, 376, 473
Engineers' Club of the Northwest	88
Experimental researches on the strength of materials	481
Explosions in coal mines	272
Explosive agents, development of force from	506
Explosive compounds	31
Explosives at Royal Arsenal	378
Fairlie engine for Mexican railway	374
Fireless locomotive	362
Fire-proof building	533
Fire-proof construction	515
Fire-proof flooring and fire-proof construction	33
Flow of water in pipes and vessels	275
Force and matter	393
Forges, novelty in	282
Foundations under water	360
Freight and passengers, transportation of	227
Fuel	235
Fuel, economy of	65
Fuel, economical consumption of	192
Furnace top	90
Ganges, solution of the battle of	366
Gramme's magneto-electric machine	442
Gun, new rifled 9-inch Armstrong	565
Gun, Sutcliffe	96
Heavy goods locomotives	123
Himalayas, road construction in	500
Horse-power of boilers	406
Hydraulic motors	543
Hydraulic mortar in France	70
Hydraulics of great rivers	312, 432
Hydraulics, our knowledge of	408
India, public works in	412
Influence of acids on iron and steel	511
Influence of temperature on the elastic force of certain forms of springs	24
Injector, theory of the Giffard	182
Iron and manganese, alloy of	377
Iron bridge at Boonville, Mo.	91
Iron-clad question	74
Iron, hardening surfaces of	185
Iron industry	401
Iron, influence of acids on	511
Iron, method of refining and converting cast iron into	113
Iron, manufacture of wrought	281
Iron, notes on	200
Iron, pig, rich in silicon	564
Iron product of Missouri	281
Iron produce of the world	474
Iron, regeneration of burnt	184
Iron ships, compass adjustment in	425
Iron steamers for South America	378
Iron structures, stability of	336
Iron trade	90
Iron trade in Reading	280
Iron, welding of	185
Jarre's power pump	565
Liquefaction in steam cylinders	22
Load-draught of steamers	38
Locomotive, a novel	186

	Page
Locomotive engine boilers, calorimeter in	48
Locomotive, fireless	362
Locomotives, heavy goods	123
Locomotives, modern	45
Machine, Gramme's magneto-electric	442
Machine, Riehle's testing	96
Machinery applied to manufacture of watches	353
Magnets, attraction of	521
Magnetism	383
Manufacture of compressed stone bricks	245
Manufacture of explosive agents	369
Manufacture of steel	335
Manufacture, terra-cotta	37
Mechanical production of cold	447
Method of refining and converting cast-iron into iron or steel	113
Metrological reform	399
Modern European style	504
Mortar, hydraulic	70
Modern locomotives	45
Motion, Peaucellier's perfect parallel	435
Narrow gauge in the United States	282
Narrow gauge railroad	564
Narrow gauge, speed on	377
Navigation, safety of	47
New rifled 9-inch Armstrong gun	565
On the screw rudder	566
Ordnance report on rifles and heavy ordnance	93
Our knowledge of hydraulics	408
Pavements, asphalt and wood	530
Peat	140
Peaucellier's perfect parallel motion	435
Piles, sinking of	515
Pneumatic process of sinking piles	513
Pneumatic tubes	129
Pola Basin, dock and railways	305
Pollution of rivers and its prevention	171
Portland cement	349
Pump, Jarre's power	565
Preservation of timber	523
Probable cause of the destruction of boiler tubes	71
Propellers, screw	164
Proportions of pins used in bridges	28
Proposed piercement of Mont St. Bernard	209
Propulsion, screw	502
Public works in India	412
Pump, Jarre's power	565
Railroad apparatus	475
Railroad freight traffic, elements of cost of	461
Railroad, narrow gauge	564
Railway, Bombay, Baroda and Central India	480
Railway, Fairlie engine for Mexican	374
Railway, spliced carriages on the Mexican	474
Railway, Union Pacific	475
Railways, English and American	283
Railways, Pola Basin	305
Railways, Servian	112
Recent improvements in steam boilers	557
Resilience of metals	481
Resistance of materials	244
Reservoirs, design and construction of	1
River Pollution, reports of Commission	538
Rivers, Chinese	480
Rivers, hydraulics of great	342, 432
Rivers, pollution of, and its prevention	171
Road construction in the Himalayas	500
Roofs, construction of conical	544
Rudder, screw	566
Safety at sea	284
Safety of navigation	47
St. Gothard tunnel	565
Scientific and industrial education in the United States	345
Scientific errors	357
Screw propellers	164
Screw-propulsion, experiments on	502
Sewage deposits, drying of	250
Sewage, notes on	254
Sewage system, Target's	396
Ship-building, Clyde	284
Ships, compass adjustment in iron	425
Ship, copper-clad	189
Ship, Russian circular	92
Slag, disintegration	509
Solar heat as a motive force, application of	111
Solution of the Battle of the Gauges	366
Some open questions in bridge building	61
Ships unarmored, speed of	518
Speed of unarmored ships	518
Springs, influence of temperature on	24
Steam boiler explosions	155
Steam cylinders, liquefaction in	22
Steam engines, choice of	267
Steamers, load draught of	38
Steel, chemical constitution of	210
Steel, definition of	281
Steel, hardening of	184
Steel, influence of acids on	511
Steel liners, application of, to the high-pressure cylinders of compound engines	138
Steel manufacture of	335
Steel, method of refining and converting cast iron into	113
Steel prize in Berlin	474
Steel, tests of	82
Steel, welding of	185
Storage and distribution of water in India	176, 212
Storage of explosive agents	369
Strength of boiler shells	40
Strength of materials	481
Strophometer, or speed indicator	541
Successful utilization of blast furnace slag	109
Target's sewerage system	396
Telegraphic engineering	257
Telegraphy, application of, to navigation and meteorology	166
Terrestrial electricity	440
Tests of steel	82
Theory of arches	97, 193, 289, 385
Theory of the Giffard injector	182
Thunderstorms and structures	63
Timber, preservation of	523
Torpedo detector	536
Traffic, production of	227
Truss, Bollman	253
Tubes, pneumatic	129
Tubes, surface condenser, corrosive effect of impure water upon	125
Tunnel, Channel	271
Tunnel, collapse of	475
Tunnels, largest	378
Tunnel, proposal for a third Alpine	188
Tunnel, St. Gothard	565
Tunnel, ventilation of Hoosac	188
Utilization of slag	509
Vienna Dome	417
Voltaic current, intermittence in	192
Water, flow of, in pipes and vessels	275
Water, foundations under	360
Water, storage and distribution of, in India	176, 212
What is fire-proof construction	515
Works of 1873	186
Wood pavements	530